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UPI's growth has been impressive, but with banks' underlying digital infrastructure struggling to keep pace, there are challenges ahead



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Time to revamp!



Motivating banks to invest in technology is not the job of the central bank. Rather, it is a business priority for banks

Shyamanuja Das

The cover story this month is on the spectacular growth of UPI and the growth pangs that it has been witnessing of late. The technical decline numbers of UPI that is rising in the last few months surely has implications for UPI's popularity going forward. And that is largely what the story focuses on.

But the data points towards a bigger concern. If you move beyond the average values, you will find that the technical decline rates are very different for three classes of banks—new payment banks like Paytm Payments Bank and Airtel Payments Bank; new private sector banks like HDFC Bank, ICICI Bank and Axis Bank; and of course, the large number of public sector banks and some old private sector banks—with the decline rates the lowest for the first and the highest for the last category.

Experts and insiders point to a clear issue of digital infrastructure. The infrastructure of the public sector and old private sector banks have failed to keep up with the new demand—both volumes as well as complexities.

UPI technical decline numbers are just one manifestations of a bigger problem. Worldwide, the advent of tech-leveraged fintechs is ushering in a new innovation era in financial services. While we may have seen fintech vs banks debate earlier—which is normal in any regulated industry—we realize now that banks have to be an essential part of the entire ecosystem. The regulators have to ensure the balance between a fool-proof trust mechanism, which banks have built over the years and innovation, which the newer fintechs are bringing in.

The banks and fintechs have to cooperate and compete. For that, the banks have to be proactive about their technology plans. During the stint of Raghuram Rajan as RBI governor—and months after his exit—RBI was actively pushing banks to digitize—to better customer service, bring down the cost of transaction and build efficiency in terms of financial positions and operational attributes.

While the efforts of ensuring security are still on—there is no other option for a serious regulator—pushing and incentivizing banks to upgrade technology is not explicitly in the regulators' agenda. The zero-MDR charge on UPI transactions is one example of banks not being encouraged to invest on new technology.

While RBI was doing it proactively, motivating banks to invest in technology is not the job of the central bank. Rather, it is a business priority for banks. There too, many government banks complain that they do not have a free hand. That complaint surely has a basis, but I do not think the ministry would meddle in their technology plans.

Banks can decide to keep complaining or they can decide to prepare themselves for the future—to leverage their trust and presence and usher in innovation products and enhance customer services—and lest we forget, being more efficient—by leveraging technology.

A complete transformation vision based on leveraging technology is an absolute need of the moment. The isolated, often ad hoc, technology implementations are clearly not enough. ■

Content

■ COVER STORY | PAGE 06



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■ OPINION |
PAGE 12-14
**Is It A New
VMware?**



■ INSIGHT | PAGE 15-17
**Building A Robust
Multi-Cloud
Environment
With SD-WAN**



■ INSIGHT | PAGE 22-23
**Need For Specialized
Skills In The FinTech
Industry**



■ INSIGHT | PAGE 28-29
**5G Or Wi-Fi 6:
What Will Power
The Enterprise
Network?**



■ INSIGHT | PAGE 34-35
**Are You Keeping Up
The Morale Of Your
IT Team?**



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Music is a language that anyone can understand and its power to rejuvenate, relax and boost our happiness is sublime

On A Blissful Musical Journey...

NEXT100 Winner 2016 **Pankaj Mishra**, Senior Manager - Global Technologies, Innodata shares his love for music and highlights the musical instruments he plays...

"Music is a world within itself, with a language we all understand"
- **Stevie Wonder**

I'm a music lover since childhood. Although I was not initially aware of this, but as I grew up, my feeling about music kept growing. My father bought me a mouth organ when I was in sixth standard and I still remember my happiness when I played any musical instrument for the first time in my life. Since then, my passion about music has kept growing.

I really love indulging in music whenever I find some spare time. Music, whether vocal or instrumental, gives me a real peace of mind. It is like a therapy that brings me closer to immense bliss, comfort,

and relief. I also love singing as it heals me from the inside and empowers me to start afresh. Listening and singing 80s and 90s Bollywood music is my favorite pastime since it also gives me a glimpse of my childhood. Listening to soft, calm and romantic music reduces my fatigue and stress and refreshes my day. Exhausted from long office hours, mails, conference calls, team meetings, etc., finding some time to listen to good music lifts my mood, reduces anxiety, boosts happiness and gives me the comfort and relaxation I require.

I also love playing various instruments like Guitar and Keyboard in parallel to listening and singing. Though learning to play these instruments is a time-consuming hobby, but it is worth spending time on something you are passionate about.

My musical journey was almost affected post my work-life due to long work hours and commute but COVID gave me another opportunity to rejuvenate my passion due to work from home. Now I can at least spare some time to spend with my musical instruments.

Music is a part of all of our lives from when we are growing up to when we get old. It is something that we all enjoy in the course of our lives. It is one of the most calming and soothing things in this world. It is a universal language, and you don't necessarily need to understand the words in a song to enjoy it. For me, music is the most beautiful gift of God to mankind.

I strongly believe that music is a language of spirit and it opens up a secret of life, bringing peace, and abolishing strife. ■

As told to Dipanjan Mitra, Team ITNEXT



Pankaj Mishra

Pankaj Mishra is Senior Manager - Global Technologies at Innodata. He has been a NEXT100 Winner in 2016. Mishra completed his BCom

from Delhi University. He holds certifications in CEHv7, EC-Council; CCNP, Cisco; CCNA, Cisco; MCSE, Microsoft.

Snapshot



No Perfect Time To Travel.... Do It Now!

NEXT100 Winner 2016 **Vijay Vora**, Head - IT Infra at Hindalco Industries shares his immense passion for traveling and how it helps in his personal and professional life...

Life has become very hectic nowadays, seldom you get chance to rejuvenate yourself from your busy schedule and relax. Traveling offers a great opportunity to escape from the monotonous routine of everyday life and provides the much-needed break. Traveling has always been my passion since early childhood. I remember I have never missed my school picnic

Traveling is a great stressbuster with the added bonus of meeting new people, making new friends and enjoying local culture

whether it was for one day or a week or whether it was a school camp or a long trek. I just love travelling. Traveling to new places, helps me to connect with nature, meet new people, make new friends, experience different cultures, lifestyle and enjoy local vegetarian cuisine.

It's my personal opinion that traveling is a great way to destress yourself and get connected with self. The thought of going on vacation or visiting a new place excites me. When I am on vacation, I am away from the things, which keeps me occupied in daily routine life. Traveling helps to focus on myself.

I still remember my school days when we used to go for camps and it was so much fun and exciting where we used to do daily activities like cooking, washing clothes, etc., on our own and it was such an amazing experience. Even today, I love to go for long treks and one of the longest treks I did was to Bhima Shankar during the monsoon season and it was so much fun and served as a stress buster. The other best thing I love during traveling is having local cuisine at places I visit. I prefer to have food in the local style and as per local culture. I personally feel fit and fine when I am traveling, even though I don't do much of physical workout but when I am out on vacation or visit new places, I always feel charged up and happy. Traveling helps me to learn to adjust in different conditions and situations which in turn help me to be a better, well-rounded person in life.

I prefer to travel by train on my holidays unless there is time constraint, enjoy the *chatpata* stuff you get at every station and not to miss the hot 'cutting chai'. I always look for opportunities to visit places across India. However in the current situation, I've not been able to travel much recently and when things turn normal again, I'll just backpack and set out! ■

As told to Dipanjan Mitra, Team ITNEXT



Vijay Vora

Vijay Vora is Head - IT Infra at Hindalco Industries. He has been a NEXT100 Winner in 2016. Earlier, he was associated with L&T Infotech in various managerial and leadership capacities. Vora completed his

Snapshot

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UPI's growth story has been impressive, but with banks' underlying digital infrastructure struggling to keep pace, there are challenges ahead

By Shyamanuja Das



nified Payment Interface, UPI for short, has been a game changer in the Indian payment system. The rise of UPI, developed by National Payment Corporation of India (NPCI), has not just democratized digital payments in India, but also picked up on value term. There is hardly any parallel to such a spectacular growth anywhere else in the world, not to talk of the developing world with so little digital penetration.

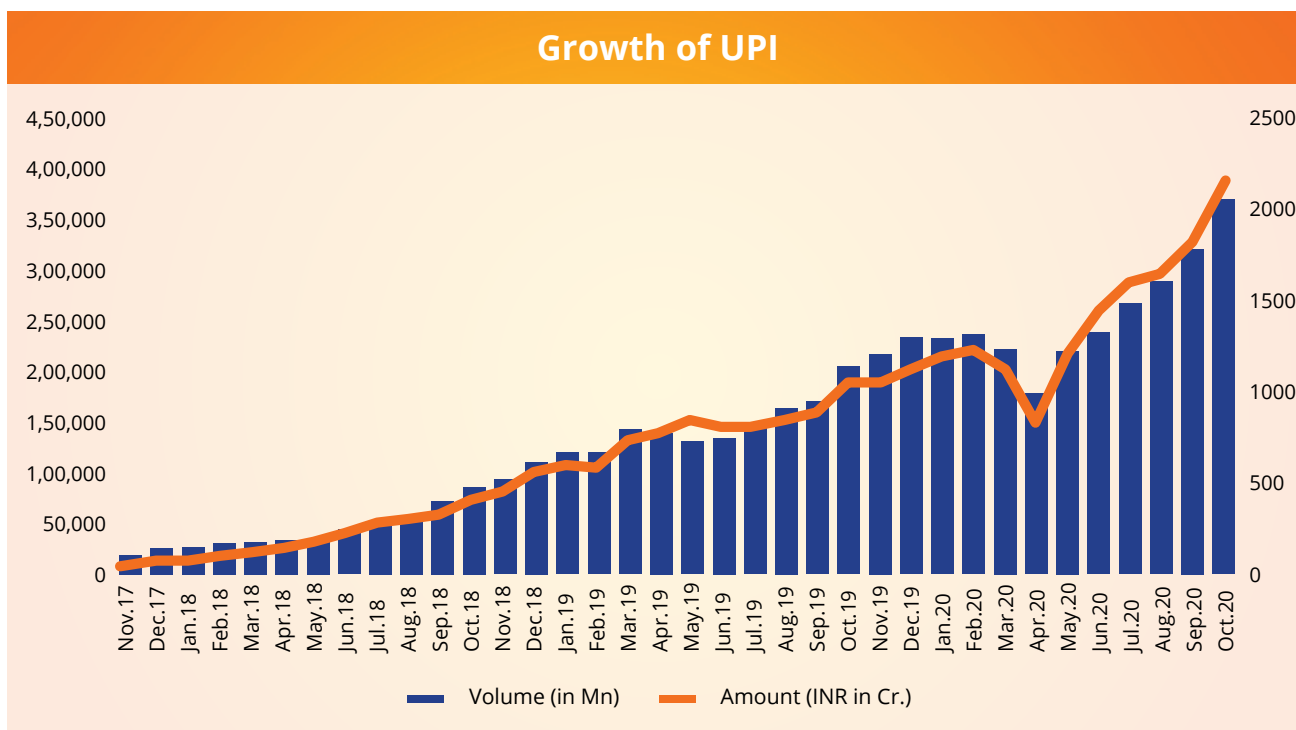
In October 2020, UPI transaction volumes topped two billion. That is a 20-fold rise in monthly transactions over the last three years. In terms of value, last month saw a total of INR 3,86,107 crores being transacted, which is a 40-fold increase in monthly values being transacted in the same period. They translate to a whopping 170% average annual growth (CAGR) in terms of number of transactions and 242% CAGR in terms of value being transacted on UPI every month. That is impressive by any standard.

The fact that values have grown at a significantly higher rate than number of transactions shows that the popularity of the system has not just resulted in its widening UPI's base but also its depth of usage.

A comparison with a similar system will put the growth in context. In FY 2016-17, IMPS transactions totalled 507 millions with a total value of INR

4,11,624 crores. UPI, on the other hand, totalled 17.86 million transactions with a total value of less than INR 7,000 crores. The corresponding figures for the last year (2019-20) for IMPS were 2,579 millions (more than five times) and the value transacted was INR 23,37,541 crores (close to four times). UPI, by the way, had grown to 12,519 millions (about 70 times) while value transacted on UPI rose to INR 21,31,330 crores (more than 300 times). In the first six months of this year (FY 20-21), UPI had already done 8,487 million transactions with a value of INR 15,49,240 crores while IMPS had done about one-seventh in terms of transactions and about 20% less in terms of transacted value, UPI having overtaken IMPS in February this year, in terms of value—and thus establishing itself as the prime mode of retail transaction.

Wallets, which actually kickstarted digital payments in a major way, accounted for 397 million



transactions as compared to UPI's 1,619 million transactions. Value of transactions would not be a fair basis for comparison as wallets have restrictions of INR 10,000 per month without KYC and INR 1,00,000 per month with KYC. UPI, on the other hand, does not require any KYC, as that responsibility is with banks, anyway. So, higher valued transactions can be done. In fact, UPI transaction limit of INR 1 lakh per day is not an issue for most of the ordinary users.

UPI, which has often been described as the brainchild of former RBI governor Raghuram Rajan, and his 'parting gift' to India because it was launched a few months before his tenure ended, has since then, been aggressively promoted by the government.

Three reasons have contributed to UPI emerging as the most popular retail payment mechanism – a number of inherent features, almost no cost to the user and the merchants, and very aggressive promotion by the government.

First and foremost: the user does not have to block his/her money, as in case of wallets which popularized digital payments. Money is directly transferred from the bank account. UPI is also interoperable. A merchant can accept money from any of the payment apps used by the payer. However, a major constraint for many users is that the wallet transaction value is capped at INR 10,000 per user if KYC is not done. KYC is a major inconvenience

for the user and is costly and time consuming for the wallet service provider. In UPI, there is no need for any KYC, as the bank has already done the KYC. So, that is a major hurdle removed for both the parties—users and payment apps.

When it comes to P2P money transfers, unlike direct IMPS, a UPI-based transfer can be done immediately without waiting for the payee to be activated by the system. While for the friends and family, it is still a good option, few would like to add a Kirana store or a petrol station to their payees in their bank account. Finally, you need not know/share the bank account number, and IFSC code of the bank branch which does not just make it more convenient to use, but also makes it safer in the eyes of the user, as not many are comfortable in sharing one's bank account number.

In addition to that, UPI has been aggressively promoted and incentivized by the government. From Prime Minister to IT minister and all senior government officials have promoted UPI directly on social media. In addition, MDR (merchant discount rate) for UPI transaction was mandated to be zero by the government. What it means is that UPI transactions now do not cost anything to the payee (including the merchant) or the payer. That is another huge reason for the popularity of UPI.

Finally, the government has also promoted UPI consistently. From Prime Minister to IT minister, all have talked about UPI publicly.

The UPI 'Market'

Sensing the government was moving towards interoperability and a government backed interface was readily available, many payment service providers promoted UPI aggressively. Especially for the challengers to Paytm, which benefitted immensely from it being 'at the right place, at the right time' during demonetization and was clearing zooming ahead, it was a good rallying point.

Google Pay built an early lead in the UPI-based payment market, while PhonePe was a distinct and somewhat distant second. Paytm too moved aggressively and has now picked up market share but Amazon Pay has also emerged as a major challenger. Latest market share figures are not available, but according to a Bernstein estimate, as reported by Business Insider, in May 2020, Google Pay held 38.4% share, while PhonePe had 19.8% share. Amazon Pay and Paytm had 16% and 15.5% shares respectively. Another report by TechCrunch, based on NPCI data suggested that Google Pay had 540 million UPI transactions, PhonePe had 460 million while Paytm saw 120 million in the same period. Since then, Amazon Pay has clearly increased its share.

Earlier this month (November 2020), as UPI volumes topped 2 billion transactions per month, NPCI put a cap of 30% share of total volume of transactions processed for any single third party application provider. This will come to effect from 1st January 2021. The existing providers exceeding the specified cap will have a period of two years from January 2021, to comply with the same in a phased manner. The cap of 30% will be calculated basis the total volume of transactions processed in UPI during the preceding three months (on a rolling basis).

NPCI said it "will help to address the risks and protect the UPI ecosystem as it further scales up." Expectedly, the two top players, Google Pay and PhonePe—incidentally both owned by foreign companies, Google and Walmart respectively, have criticized the decision, saying it will negatively impact the users.

While we do not get into that debate in the story, one thing is for sure. The UPI volumes are showing no signs of slowing down.

As discussed above, three reasons have contributed to UPI emerging as the most popular retail payment mechanism – a number of inherent features, no cost to the user and the merchants, and very aggressive promotion by the government.

What needs to be examined is how important are the three reasons in comparative terms. For something to sustain in the market, it has to com-

pete on natural market parameters, not artificial parameters like the last two, cost and government push.


Is it sustainable?

It may be too dramatic to ask if UPI is sustainable, considering the threshold volume that it has already reached. But for the same reason, it is important to examine whether the underlying infrastructure is ready to support these rising volumes.

Early signs about the cracks were already evident from 2018. Users have been complaining about false success notifications; i.e. while the app said the transaction was successful, the money was not credited to the receiver's account. Despite several follow-ups with their banks and NPCI, the issue took a long time, paper trail and exchange of several messages to resolve. In a report in March 2018, business daily, Business Standard wrote about the problem, citing several aggrieved users of UPI.

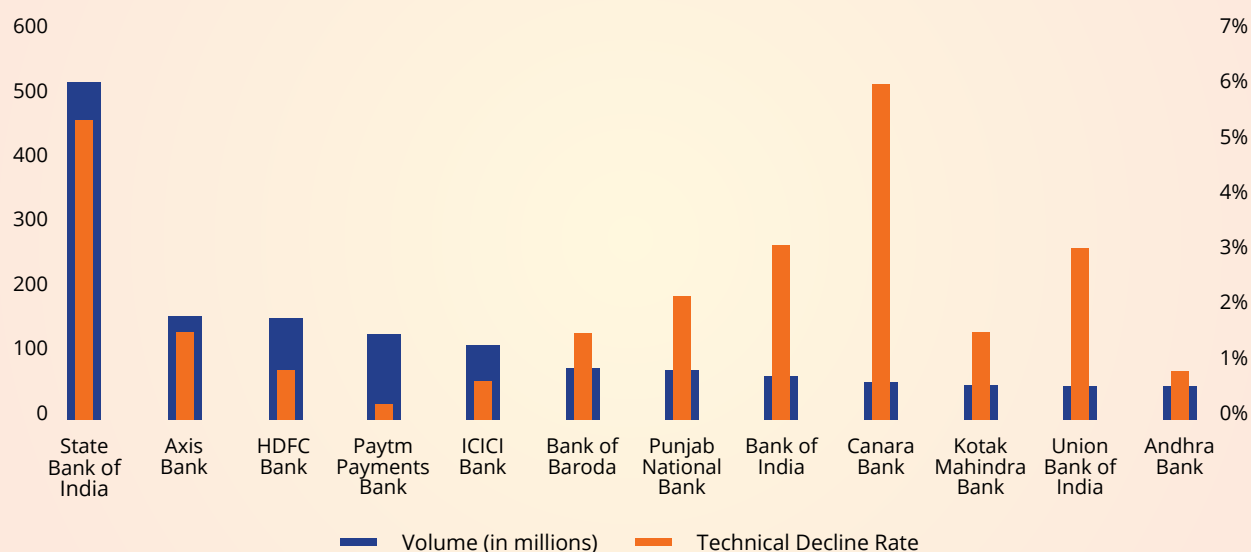
But with very tangible convenience and cost advantages, these 'exceptions' did not adversely impact the popularity of UPI as a payment mechanism.

After all, such exceptions were few and far between. These errors happen when the transaction is declined due to technical reasons, such as unavailability of systems and network issues on bank or UPI side and are hence called technical declines (TD) to distinguish them from declines due to user side issues, such as wrong PIN, wrong account number, violations per transaction or per day limits, etc, which are called business declines (BD). While the business declines are not due to



Sensing the government was moving towards interoperability and a government backed interface was readily available, many payment service providers promoted UPI aggressively

Banks with highest UPI Volume (with TD rates)



the UPI system, technical declines are clearly due to issues on the system side.

Till as late as in March this year, these technical declines ranged between 0.1% of transactions to 1.91% of transactions for different banks. From the eight banks that saw high transaction volumes (more than 30 million per month), seven had less than 1% technical decline rates. That was not something to be get too concerned about, even though the largest of them, State Bank of India, had seen 1.84% technical declines.

Things have deteriorated sharply. In September, the technical decline rate had reached 2.7% of total transactions. For banks with larger transaction volumes, it was even higher at 2.9%. As many as eight of the top 30 banks whose data is available had more than 3% technical decline rate, with some touching almost 6% (Canara Bank, 5.93%). State Bank of India, which accounts for 27% of all transactions executed by these 30 banks, had 5.31% technical declines.

But what is revealing is the sharp contrast that exists between public sector and private banks. While the 11 private sector banks saw a technical decline rate of only 1%, the public sector banks' TD rate was almost four times higher at 3.8%. Within private sector banks, both the payment banks – Paytm Payments Bank and Airtel Payments Bank – saw technical decline rates of less than 0.4%.

The reason for this contrast is not too difficult to guess. Many of the public sector banks have

aging digital infrastructure, which are probably not equipped to handle these high volumes. UPI transactions require almost real-time communication involving five servers—payer payment service provider (PSP), remitter bank, UPI system, payee PSP and the receiver bank. Any latency or break in communication can result in transaction failure. In times of high volumes of transactions, the server may choke. Since the UPI request hits a bank's core banking system, unlike the wallets, it puts pressure on the bank infrastructure.

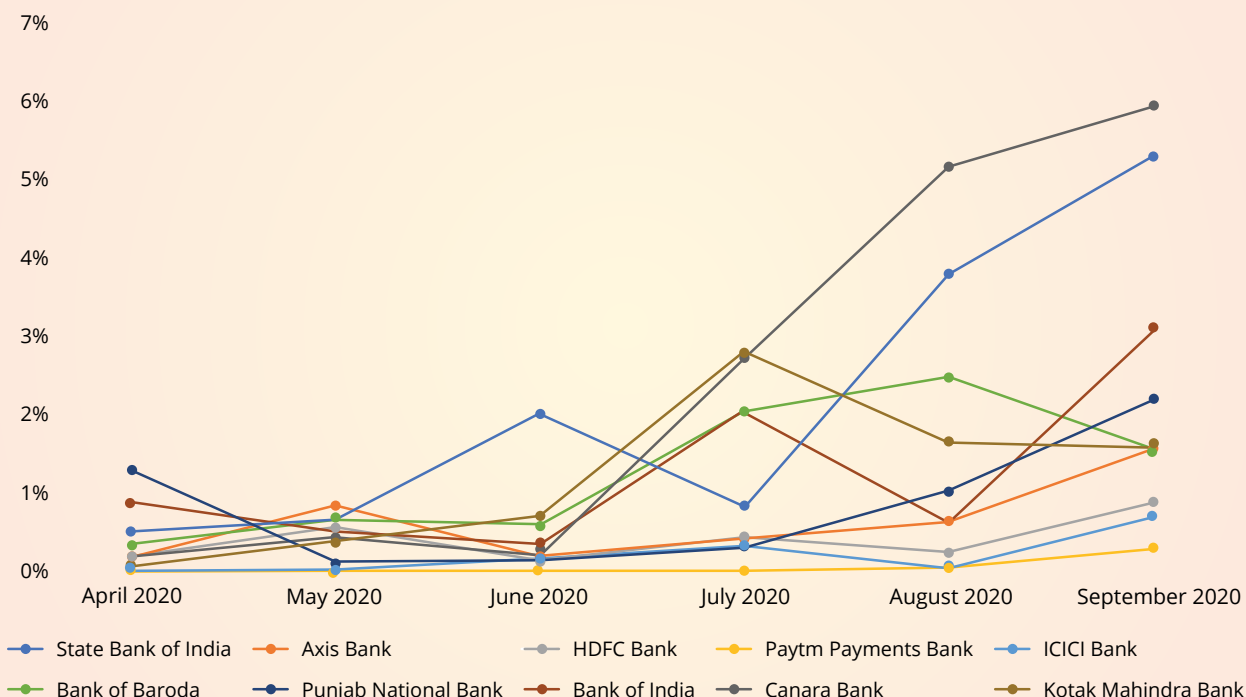
So, even though Paytm Payments Bank and ICICI Bank have high volumes, their technical decline rates are quite low. Most older banks need to upgrade/modernize their infrastructure to ensure that technical declines are minimized. Private sector banks and the new payment banks have state-of-the-art digital infrastructure that handle the transactions better.

But thanks to the zero MDR rule mandated by the government last year, banks are not supposed to charge any fees, which means they do not earn anything from the UPI transactions. So, they have little incentive to upgrade the infrastructure.

Banks and NPCI have been voicing these concerns and have been demanding zero MDR rule to be changed. But even if the government listens to that, it is highly unlikely that things will immediately change for better.

Another potential threat in the future is the vulnerability of the NPCI system. NPCI has capped

How TD rates have shot up (for banks with high UPI volumes in last six months)



the share of transactions of any single payment company in order to decrease dependence on any single third-party application, to avoid a system failure. The same question could be asked about the NPCI system too. While the UPI system uptime has been maintained above 99.8% every month since January, that could be vulnerable too. And even 99.83% (April) or 99.85% (September) are low by a real-time transaction system standard.

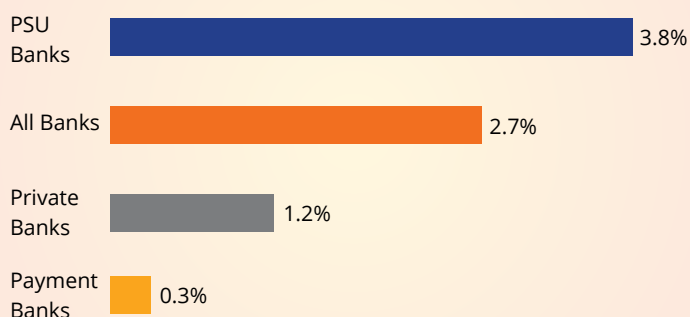
In short, while UPI has had a successful run so far, past performance cannot be guaranteed.

For the banks, which have to keep their customers, there is no option but to modernize their digital infrastructure to handle high volumes of real-time transactions, as volumes will only go up. Of course, the government decision on zero MDR is hurting them. But even if the government reverses the decision, things will not dramatically improve overnight. It needs thorough technology planning that could take several months to execute.

When Raghuram Rajan had envisaged such open payment systems, it was part of a bigger vision to push banks to adopt digital technologies. However, while UPI has been milked, many of the other components of that vision are missing. It is not surprising that we are seeing gaps.

Beyond UPI too, banks need to assess their readiness for an increasingly 24-7 transactions world with high volumes of transaction. That is the next challenge for Indian banks, especially the public sector and old private sector banks. There is no other alternative. ■

Technical Declines by Category of Banks





Is It A New VMware?

Not yet, but VMworld 2020 saw many important strategic announcements that would help position VMware as a far more critical player in the enterprise technology landscape

By Shyamanuja Das

Are we likely to see a new VMware soon, post the plethora of announcements at VMworld 2020 and the directions that they demonstrated?

If you are a confirmed VMware supporter, this question would look out of place to you—was there even a need for that? It has been treading on the hybrid, multi-cloud path, with promises of security and manageability loud and clear. In its new messaging of late—revolving largely around its VMware Cloud Foundation (VCF)—explicit reference to traditional virtualization offer-

ings is very subdued. So, it was on a new path, anyway.

But if you a cynic, you will point out that there is still a long way to go before CEO Pat Gelsinger's claim of VMware delivering "the digital foundation for an unpredictable world" can be considered a legitimate claim.

Both the opinions are right, in their own ways. The direction is most definitely there, which confirms the opinion of the supporter camp and it is still some way from that destination, which is what the cynics would say.

That is why the time to examine the question is now.

For that, let's break up the big question into two sets of specific questions:

- Technology capability and addressing the market needs
- Positioning before the customer

Technology capability and addressing the market needs

This is all about offerings, their completeness, the future path and tapping new unexplored opportunities. Let's address one question at a time.

Is the portfolio more comprehensive now? For any company worth its name, an annual event like this is a great opportunity to announce a

series of new products, solutions and investments. VMworld saw a whole lot of that. And many of them are continuations of its existing strategy.

This is what CEO Gelsinger said at VMworld 2020, “We deliver five critical building blocks. First, app modernization with Tanzu. Second, our multi-cloud portfolio with VMware Cloud. Together, app modernization and multi-cloud form the core stack. They go together like fish and chips. Then, there’s digital workspace, the key to driving employee engagement. Underlining it all is our Virtual Cloud Networking portfolio. And perhaps most importantly, intrinsic security is architected into everything that we do. Putting it all together, it is the digital foundation of an unpredictable world.”

Till you come to the last line, it all adds up nicely. Traditionally, VMware has been an infrastructure company. Since it has been active on the public cloud front, it has been strengthening its application side offering. Introduced at the last edition of VMworld in 2019, VMware Tanzu, a portfolio of products and services for modernizing applications and infrastructure, has been the mainstay of its messaging of late. Over the last year, VMware has rapidly added to the Tanzu portfolio, expanded its partner ecosystem, and added new customers even while continuously adding to the capability through acquisitions like Bitnami, Heptio, Pivotal, and Wavefront—not to say that it has not done organic innovations. The company has also embedded Kubernetes in the VMware vSphere control plane, as vSphere with Tanzu, providing customers with a single platform for all applications.

Same goes for the ‘intrinsic security’. It has been a major component in its multi-cloud story—especially around the marketing of its NSX-T, now called NSX-T Data Center. In VMworld 2020, almost all new announcements—from applications to networking—emphasized on the intrinsic security part. In what it called the Next Wave of Virtual Cloud Network Innovation, VMware identified

three areas of innovation, one of them being re-imagining ‘what’s possible in network security.’

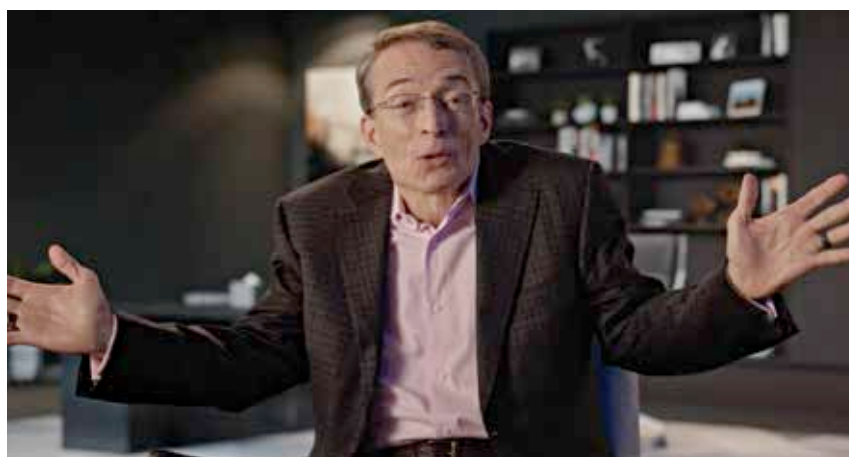
“VMware will deliver unmatched levels of firewall performance and programmable intelligence to the Virtual Cloud Network by enabling VMware NSX to run on leading SmartNICs. This includes advanced security for bare metal and highly sensitive workloads such as databases which are hard to protect today. Additionally, it enables “air gapping” of infrastructure, separating applications and hypervisors from the security controls on the SmartNIC. VMware is also announcing VMware NSX Advanced Threat Prevention, which combines NSX Distributed IDS/IPS with advanced malware detection (sandboxing) and

Undoubtedly, VMware’s five building blocks are getting more and complete. The question about their leading to the “digital foundation of the unpredictable world,” remains though.

Is it addressing market gaps?

While VMware did a number of announcements that are market-leading, one announcement stands out. That of Project Monterey—a technology preview focused on evolving the “architecture for the data center, cloud and edge to address the changing requirements of next-generation applications including AI, machine learning and 5G applications.”

Yes, it is still a technology preview and availability time frame is still not clear. But it has gone full stream by announcing ecosystem partners,



VMware CEO Pat Gelsinger

AI-powered Network Traffic Analysis (NTA) acquired from Lastline, Inc,” the company said.

“Legacy security systems are no longer sufficient for organizations that are using the cloud as part of their computing infrastructure. It’s time to rethink security for the cloud, organizations need protection at the workload level, not just at the endpoint. The future of cloud must be met with a better way to secure data and applications,” said Sanjay Poonen, chief operating officer, Customer Operations, VMware, while unveiling “VMware Carbon Black Cloud Workload”, leveraging the expertise of Carbon Black, which it acquired a year back.

such as Intel, NVIDIA and Pensando Systems and system companies, such as Dell Technologies, Hewlett Packard Enterprise (HPE) and Lenovo.

As organizations move to more distributed, data-intensive apps in the data-centric business models, by leveraging newer technologies like IoT and machine learning, this, if it manages to fulfil the promise it has started with, may effectively address the new needs.

As part of Project Monterey, VMware announced evolving VCF to support SmartNIC technology (also referred to as Data Processing Units or DPUs), which will help VCF to maintain compute virtualization on the server CPU while offloading net-

working and storage I/O functions to the SmartNIC CPU and rearchitecting VCF to enable disaggregation of the server including extending support for bare metal servers, which will enable an application running on one physical server to consume hardware accelerator resources such as FPGAs from other physical servers. Each SmartNIC would run a fully-featured stateful firewall and advanced security suite, reiterating VMware's promise of 'intrinsic security'.

Is it addressing the newer opportunities? Most technology companies have tailored their messaging around not just rebound, reimagine, New Normal—the phrases that have become popular post the pandemic but have repositioned their solution keeping an eye on the changes. So, 'contactless', 'remote working', 'distributed workforce', 'secure access' and 'threats in the WFH,' etc have become new themes to not just change the messaging but also realign the solutions.

VMworld 2020 saw VMware joining the bandwagon. It announced the Future Ready Workforce solutions leveraging VMware Secure Access Service Edge (SASE), its digital workspace and endpoint security capabilities, for a safer user experience for the distributed workforce leveraging cloud.

"The VMware SASE Platform converges cloud networking, cloud security and zero trust network access with best-in-class web security to deliver flexibility, agility, and scalability for enterprises of all sizes," the company said.

It remains to be seen if customers see unique value in this offering.

But all these surely mean that VMware is now well suited to provide the five building blocks that Gelsing promises.

But whether that would be enough for VMware to be considered a 'digital foundation' provider by the customers is still open for debate. Even bigger question is—even if it is—is VMware's messaging good enough to capture the CIO mindshare?

That precisely is our next bucket of questions: VMware's 'new' positioning before the customers.

Positioning before the customers

The positioning is mostly about being able to build a clear and convincing narrative. We take three specific questions.

Is the whole better than sum of parts? Though it still has a long way to go, VMware's tying together of solutions is much better as compared to what it used to be. VMware got into people's mindshare as a virtualization company. In fact, many junior techies would use vSphere as a synonym for VMware. So, when it expanded to public cloud, multi-cloud, it had to do a lot of convincing. One of the first steps was to integrate its vSphere, vSAN and NSX and package it as VMware Cloud Foundation (VCF) for the hybrid cloud era.

As illustrated above, it has since kept adding and integrating different components to provide better and bigger value to its customers. All its messaging in the last few years has been around VCF.

And the existing users of VMware have seen some enhanced value.

Is the messaging clear, rightly targeted and convincing? Can its traditional customer base be leveraged? These are two different questions but are dependent on each other. And this is where VMware has to do a lot of catch-up.

The new messaging of VMware around VCF has been targeted at the CIOs, pitching the strategic importance of VMware solutions for a new hybrid, multi-cloud era. In the last five years, most enterprise technology players—not just the application players like SAP, Oracle and Salesforce but also the likes of IBM, HPE, not to talk of Microsoft and Cisco—have retuned their marketing messages to position their solutions as business solutions. That is visibly missing from VMware's messaging still.

While one can only guess why it is so, a plausible reason could be dis-

connect between the actual users of its traditional virtualization software and the target of the new messaging. The new messaging for VCF—not to talk of the builder of a digital foundation for the enterprise—should be clearly targeted to the CIOs, who themselves have gone through a mindset change, focusing more on business metrics.

There are two gaps.

One, the message is overtly technical. And while that is understandable, considering it comes from an infrastructure background, a bigger challenge is its assumption of selling to its 'existing' customers. That is where a bigger disconnect exists.

Take India. It is a country where VMware has a solid base, as India went for virtualization quite vigorously, thanks to the cost savings it provided. But much of the actual users of these solutions are junior techies, who, while understanding the improvements and newer capabilities of the solutions, are not exactly capable of appreciating the big message. That is not a problem as such. They do not have to take all decisions.

But then, the large 'installed base', for all practical purpose, becomes a myth. It can still sell its story but the installed base is not necessarily a big strategic advantage. It can at best be a small technical advantage and at best, can be leveraged for some commercial deals.

In short, the technical capabilities that VMware has built, and has announced in VMworld 2000, makes it much more competent to stake a serious claim as a critical and front-line enterprise technology player for the cloud era—but only if it gets its messaging right. By message, one means both the target and the narrative. Needless to say, the two should be in sync. ■



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Building A Robust Multi-Cloud Environment With SD-WAN

Because of its automation capabilities, and also because of where it resides strategically in the network, SD-WAN has become the solution of choice for rapidly evolving cloud network innovations including multi-cloud

By Rajesh Maurya

Cloud adoption has become an increasingly large part of a CIO's budget with organizations leveraging many different cloud environments to build their IT infrastructure. Nearly all enterprises have embraced

multi-cloud—93% currently have a multi-cloud strategy in place. Organizations custom-select different cloud services to serve specific functions, as well as for larger advantages, such as flexibility, performance, agility, and cost savings.

But networks become a bottleneck when workloads deployed on multiple clouds through the data-center WAN edge create several challenges, including deployment complexity, inconsistent network performance and expensive connectivity. This becomes

even more complex as workloads move across cloud environments.

Software-defined wide-area networking (SD-WAN) can help facilitate the adoption of multi-cloud deployments while simplifying WAN infrastructure and reducing connectivity costs. But in order to be successful, an SD-WAN solution not only needs to understand and support multi-cloud, but also have the capacity to maintain security in even the most complex environments.

More Clouds Means More Complexity

A multi-cloud strategy allows organizations to select the best cloud services that meet the requirements of a particular application or workload and to avoid vendor lock-in. It also allows organizations to choose cost-optimized services and leverage geographically dispersed clouds to meet data sovereignty requirements, for disaster recovery, or to improve overall user experience. And a multi-cloud model also provides redundancy to reduce the risk of downtime.

Despite these myriad benefits, multi-cloud adoption undoubtedly adds extra layers of management complexity—especially if adding cloud services happens in an ad hoc manner rather than being planned from the ground up. The challenge is that each cloud environment is unique, and tools that span multiple cloud environments need to be able to connect seamlessly, function consistently, and work between different cloud environments without losing functionalities, fragmenting policies, or lowering enforcement standards. All while bridging protocols and standards on the fly between environments.

This complexity creates management and operational challenges, from deployment to network performance, to operational costs. Few IT teams have the expertise to manage a mixed deployment of multiple public cloud, private cloud, and on-premises environments—especially considering the ongoing lack

of skilled IT specifically cybersecurity talent. Lack of skilled resource will constrain organizations to trade off on security while managing complex multi-cloud environments.

Organizations that are unable to implement centralized management and monitoring, often due to deploying different security and other tools in each cloud environment, are then burdened by fragmented security policies across multiple cloud environments. They also lack end-to-end visibility of their infrastructure, which increases the risk of breaches, data loss, compliance penalties, and other damages to the business.

Previously, to overcome these challenges, enterprises have often

chosen to backhaul cloud traffic to on-prem data centers or network service/colocation provider points. While the goal is for cloud workload traffic to be centrally inspected and routed between the different clouds, these dedicated backhaul connections are often expensive and can quickly become performance bottlenecks. And this problem can be exacerbated because backhauling traffic over cloud provider VPN gateways to on-prem data centers can add significant latency and degrade application performance.

All these challenges demand a new approach for establishing secure and high-performance connectivity between multiple clouds—especially without increasing cost and complexity.



Achieve Unified Management and Security Across Multiple Clouds with SD-WAN

To get maximum benefits and flexibility out of a multi-cloud strategy requires integrated security and networking technologies. Because of its automation capabilities, and also because of where it resides strategically in the network,

Because of its automation capabilities, and also because of where it resides strategically in the network, SD-WAN has become the solution of choice

SD-WAN has become the solution of choice for rapidly evolving cloud network innovations including multi-cloud. SD-WAN allows enterprises to augment leased line connections with direct internet connections to enable their networks to utilize the most optimized links for different applications, workloads and ingress or egress use cases. As a result, SD-WAN offsets the performance degradation that is increasingly a problem due to the amount of cloud and application workload traffic across the enterprise.

All this is possible while making it cost effective for organizations without disrupting user experience.

What to Look for in an SD-WAN Solution for Multi-Cloud

SD-WAN solutions vary widely in terms of capabilities, and not all are able to adequately support a multi-cloud deployment. CIOs should carefully consider all associated issues, including functionality, management, performance, and especially, security requirements, as well as all related costs—including both capital expenses (CapEx) and operating expenses (OpEx).

Consolidated Secure SD-WAN

A siloed approach to SD-WAN requires investing in multiple devices in order to provide all the necessary networking and security capabilities required for a fully functional solution. But these piecemeal approaches have inherent gaps in security that can be exploited by cyberattacks. What's needed is a single solution that integrates advanced SD-WAN networking capabilities within a next-generation firewall (NGFW) to ensure that security and connectivity can function as a single solution. This approach can not only eliminate these security gaps, but also reduce overall CapEx investment costs.

Cloud-Native Integration and Central Management

Deploying multiple devices in SD-WAN also increases OpEx in terms of skilled resources dedicated to solution deployment, integration, optimization, and management. A cloud-native SD-WAN solution simplifies these processes. Its native integration with each cloud infrastructure simplifies policy management by leveraging meta data while providing optimal performance and low overhead connectivity across cloud networks. Additionally, it allows organizations to avoid cloud misconfigurations that can lead to bad user experience or security vulnerabilities.

SD-WAN solutions vary widely in terms of capabilities, and not all are able to adequately support a multi-cloud deployment. CIOs should carefully consider all associated issues, including functionality, management, performance, and especially, security requirements, as well as all related costs

Programmability and Automation

Developers are able to better meet network security requirements and simplify application lifecycle management routines by leveraging uniform APIs that apply changes throughout the infrastructure consistently. These capabilities are critical in order to seamlessly implement application requirements in agile and dynamic DevOps environments where CI/CD methodologies are being used to represent Infrastructure-as-a-Code (IaaS) changes.

Performance

A SD-WAN solution that is optimized for all cloud environments and one that features intelligent application awareness capabilities can address bandwidth and performance issues. The best solution should be able to reference a broad database of known applications and use custom signatures that allow it to prioritize traffic and automatically manage connections based on the real-time needs of the network. All of this while also delivering performance speeds for multi-cloud networks.

Visibility and Control

Tracking traffic patterns, performance and potential threats across multiple distributed cloud deployments can be difficult. A secure SD-WAN solution with centralized visibility integrated across multiple clouds, including cloud provider security services with

identifiers such as labels, tagging, security groups and namespaces, can provide end-to-end, actionable visibility across all cloud iterations. This ultimately provides QoE optimization, advanced prevention and detection capabilities—as well as automated cloud native controls. This in turn can help ensure compliance with data privacy laws and industry regulations, regardless of where sensitive data is stored, as well as ensure consistent management of risks without any evident weak links.

Effective SD-WAN Simplifies Multi-Cloud Challenges

An effective SD-WAN solution needs to provide an abstract, application-aware network infrastructure that can span multiple cloud environments. This enables it to remove inconsistencies through a uniform policy-defined infrastructure, while simplifying management and optimizing infrastructure costs. It also improves the agility of deployments and application experience across the enterprise. Finally, integrated security features offered by a robust, consolidated secure SD-WAN solution – especially one that can apply, coordinate, and enforce policies consistently across multiple cloud environments – can lower risks and enforce controls across enterprise infrastructures that rely on a multi-cloud strategy. ■

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Mantra To Choose The Appropriate DDoS Mitigation Strategy – Keep It Simple

There are several flavors from which to choose when selecting an effective DDoS mitigation strategy. Most enterprises opt for one of the cloud protection flavors (always-on or on-demand)

By Nikhil Taneja

The cyber industry offers a plenitude of DDoS mitigation solutions. Competition may be misleading as providers highlight terms, such as mitigation capacity, layered protections or time-to-mitigate.

DDoS Mitigation Strategies in a Nutshell

There are several options from which you can choose a DDoS mitigation strategy:

- **On-Premises DDoS Appliance:**
A DDoS detection and mitigation device installed in front of the firewall in your data center. It offers immediate mitigation of all types of attacks, including SSL attacks, but offers limited protection against volumetric attacks that saturate your internet pipe.
- **Always-On Cloud DDoS Protection Service:** A cloud service wherein your traffic is constantly routed through the provider's scrubbing center for attack detection and mitigation.
- **On-Demand Cloud DDoS Protection Service:** A cloud service that kicks in only when you are under attack by diverting your traffic to the providers' scrubbing center.
- **Hybrid DDoS Protection Solution:**
This is the best of both worlds: an on-premises device that integrates with a cloud mitigation service (can be on-demand or always-on cloud service).

How to Choose a DDoS Mitigation Plan?

There are a few guidelines that can help simplify your selection process, simply by asking the following questions:

Can you afford a few minutes of downtime when under DDoS attack?

If the answer is YES, then go for the On-Demand Cloud DDoS Protection Service. This is the lowest cost solution and offers effective mitigation against DDoS attacks. The payoff is



Can you afford a few minutes of downtime when under DDoS attack? If the answer is YES, then go for the On-Demand Cloud DDoS Protection Service. This is the lowest cost solution and offers effective mitigation...

extended time-to-mitigate of several minutes which is driven by the need to re-route your traffic to the provider's scrubbing center.

If the answer is NO, then select the Always-On Cloud DDoS Protection Service. This option provides immediate mitigation (within seconds) of DDoS attacks.

Do you process HTTPS traffic extensively?

If YES, then you need the Hybrid DDoS Protection solution, where the on-premises device mitigates HTTPS attacks and the cloud service mitigates volumetric attacks.

Are you frequently attacked?

If YES, then you need an Always-On

Cloud DDoS Protection Service. An On-Demand service may overwhelm your network with extensive diversions of your traffic.

There are several flavors from which to choose when selecting an effective DDoS mitigation strategy. Most enterprises opt for one of the cloud protection flavors (always-on or on-demand). Financial service providers, healthcare or utilities typically go with hybrid solutions, due to the nature of their business: they require utmost application availability and process SSL traffic extensively. ■

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The Key Benefits For High Availability Load Balancing

Apart from the direct cost of downtime we also see business continuity, in terms of reputation and data loss, as another factor encouraging businesses to ensure high availability is implemented

By Sanjai Gangadharan

The load balancer market is expected to grow to GBP 4.7 billion by 2023, and trends, such as mobile broadband, multi-cloud and hybrid cloud, virtualization, remote working, and bring your own device (BYOD) have helped to fuel this growth. The result is that tremendous

pressure is being placed on IT departments to ensure high availability for mission-critical applications, such as ERP, communication and collaboration systems, and virtual desktop infrastructure (VDI).

The need for high availability
High availability, which is the ability

of a system or system component to be continuously operational for a desirably long period of time, can help IT departments implement an architecture that uses redundancy and fault tolerance to enable continuous operation and fast disaster recovery. This is true for every element of the data center—from high availability for

applications to high availability for the load balancer or application delivery controller (ADC) that manages network traffic within and across the data centers in an environment.

High availability begins with identifying and eliminating single points of failure in the infrastructure that might trigger a service interruption—for example, by deploying redundant components to provide fault tolerance in the event that one of the devices fails. Load balancing, whether provided through a standalone device or as a feature of an ADC, facilitates this process by performing health checks on servers, detecting potential failures, and redirecting traffic as needed to ensure uninterrupted service.

While ensuring fault tolerance for servers is obviously critical, a high availability architecture must also consider the load balancing layer itself. If this becomes unable to perform its function effectively, the servers below run the risk of overflow, potentially compromising their own health as well as application performance and application availability. This makes redundancy just as important for the load balancer or ADC as for any other component in the data centre.

As with a high availability server cluster, there are several ways in which load balancers or ADCs can be deployed to provide high availability, including:

- **Active-standby** – The most common configuration, the active-standby model includes a fully redundant instance of each ADC which is brought online only in the event that its primary node fails. Each active ADC can be configured differently, though each active-standby pair will share the same configuration.
- **Active-active** – In this model, multiple similarly configured ADCs are deployed for routine use. In the event that one node fails, its traffic is taken over by one or more of the remaining nodes and load balanced as needed to ensure consistent service. This approach

High availability can help IT departments implement an architecture that uses redundancy and fault tolerance to enable continuous operation and fast disaster recovery

assumes that there will be sufficient capacity available across the cluster for it to function even when one ADC is unavailable.

- **N+1** – Providing redundancy at a lower cost than active-standby, an N+1 configuration includes one or more extra ADCs that can be brought online in the event that any of the primary ADCs fails.

In each case, rapid failover enables fault tolerance and disaster recovery for the load balancing function so that application performance and application availability are not affected by the failure. Failover and traffic management is typically managed through a version of the Virtual Router Redundancy Protocol redundancy standard.

Key high availability features for load balancing or ADC

In addition to ensuring high availability for your ADC, you should also make sure that your ADC provides high availability for the applications whose traffic it manages. In the event that a server fails, the ADC can reroute traffic to another available server in the cluster. Key features that enable this function include:

- **Load balancing methods** – There are several methods that can be used for server selection, including round robin, least connections, weighted round robin, weighted least connections, fastest response, and more. Your ADC should offer

all these options to allow the most suitable configuration for your environment and priorities.

- **Health monitoring** – To ensure rapid failover with little or no downtime, server health should be continuously assessed based on a number of indicators, including:
 - Time series of total bytes in and out from each server
 - Time series of traffic rates (in Mbps) in and out from each server
 - Percent of error traffic over range
 - Number of good SSL connections
 - Average application server latency by service
 - Client-side latency SRTT, max, min, and average as a time series
 - Custom health checks such as measuring the response time for specific SQL database queries

Why this is so critical?

As enterprises become further dependent on the Internet to get business done, the threat of downtime can become a competitive disadvantage. With downtime estimated to cause losses of around GBP 780,000 per week for a company with roughly 10,000 employees, the direct losses are substantial and a primary reason why businesses need to establish a high availability solution. Apart from the direct cost of downtime we also see business continuity, in terms of reputation and data loss, as another factor encouraging businesses to ensure high availability is implemented. Firstly, reputation will improve as the business and brand is known for its reliability versus its competitors. Secondly, reducing risk of data loss is essential as due to the severe penalties incurred under the terms of the GDPR. A highly available infrastructure also mitigates the negative impact of outages to revenue and productivity. ■

The author is Regional Director - SAARC, A10 Networks



Need For Specialized Skills In The FinTech Industry

The new dynamics of FinTech require people with a fusion of different skills

By Robin Bhowmik

Brett King, futurist and founder of Moven, the first mobile bank, predicted in his famous 'Banking 4.0: Banking Everywhere, Never at a Bank' in 2019, "It's (Banking) all about the experience. Any friction that isn't absolutely necessary will be eliminated from the technology

layer. Either banks remove friction...or someone else will."

This prediction is now a reality. Many non-financial firms are entering the financial services space with innovative products driven by new-age technology and emphasizing customer experience. FinTech players have incorporated emerging technolo-

gies, such as AI-ML, cloud computing, blockchain, robotic process automation, etc. with financial services – something the traditional banks never tried to explore.

When this new model played a disruptive role and enhanced financial inclusion by reaching to unbanked/underbanked segments of the popula-

tion, traditional lenders realized the significance and started widening their scope by either incubating a new financial technology wing or investing in or buying a budding FinTech startup. Indian banks are already moving towards these steps and this is spearheading the FinTech growth in the country.

For such a hyper-personalized service that it is going to be, employers are and will look out for niche talent to be a part of their organization. Hence, the specialized skills required in the FinTech industry are growing. Some of these hot roles in the FinTech space are discussed here.

Developers

As FinTech firms readily invest in web/mobile-based products or services, the developers, also called programmers, have now become the backbone of the industry. In this sector, the developers are expected to perform jobs in different areas, such as Java, Python, HTML, C++, PHP and all other programming languages.

Developers with niche skills are also in high demand. AI-ML developers are expected to create networks to give better services to customers, while blockchain professionals design the architecture of distributed ledgers, develop smart contracts, and ensure the security of the blockchain.

Data analysts

These folks in the FinTech sector are the custodians of all the data generated from operations. It is their duty to make available these data sets to all other employees in the company. Also, data analysts need to provide inputs to improve the quality of the products by analyzing the existing data thereby offering a better experience to the customers. Data analysts require mathematical and analytical skills to function well.

Financial crime specialists

These individuals are responsible for setting up or improving compliance, anti-money laundering (AML) and fraud



Developers with niche skills are also in high demand. AI-ML developers are expected to create networks to give better services to customers...

controls, auditing procedures and revamping sanctions at financial institutions. Issues like corruption, bribery, sanctions, data security, cyber fraud, etc. are complicated and interrelated activities that require a focused study and approach. Hence, these specialists should possess a combination of technical knowledge, understanding of business processes, products and services and the key vulnerabilities targeted by financial criminals.

UI/UX designers

User-friendly design is the prime value proposition of FinTech offerings. Every organization is trying to ensure that the experience on the website/app for a customer is smooth and agreeable. UI and UX designers have really focused on creating these "customer-first" designs. They develop products and services after thorough user research, concept development, design, and prototyping before releasing a product to the public. Also, UI/UX designers need to implement their strong technical skills in this process.

Financial analysts

Financial analysts are decision-makers for the financial model of the company by compiling and analyzing global and national economic conditions as well as the figures pertaining to the company. They need to identify growth areas of the company and challenges in the business operations.

The FinTech industry is one of the fastest growing industries despite the disruptions caused by the COVID-19 outbreak across the globe. The global market value is likely to grow to about USD 310 billion by 2022 with the creation of more innovative products and services. As Chris Skinner, an independent commentator on the financial markets and FinTech stated, "Technology is no longer the domain of the CIO, CTO or CFO. It is a responsibility for all and digital banks to truly understand that technology is business and business is technology." ■

The author is Chief Business Officer, Manipal Global Academy of BFSI



The New Normal: Enterprises Need To Adopt A Zero Trust Approach

As work from home continues, implementing a Zero Trust approach should be the priority for CISOs, their security teams, and users

By Sudarshan Sivaperumal

Even as the world prepares itself for the New Normal, the impact of COVID-19 pandemic on enterprise security has been huge. According to Gartner's research, 54% of HR leaders have cited that poor technology infrastructure for remote working is the biggest barrier to effective communication. Leading brands across the globe have found themselves struggling with going from a 0% remote workforce to 100% in a matter of days challenging. What used to be safe, thanks to office-based systems and procedures, may now be unsafe. Today, IT departments are facing increased pressure to ensure business continuity by providing remote users with access to essential corporate applications and services through Virtual Private Networks (VPNs).

In fact, according to the study, 88% of the workforce in India prefers to have the flexibility of working from home. In addition to this, 69% of Indian employees believe their productivity has increased while working remotely. With the modern workforce becoming increasingly on the go, accessing applications from multiple devices outside of the business perimeter, enterprises have adopted a "verify, then trust" model which means if someone has the correct user credentials, they are admitted to whichever site, app, or the device they are requesting.

This has resulted in an increased risk of exposure, dissolving what was once the trusted enterprise zone of control and leaving many organizations exposed to data breaches, malware, and ransomware attacks. Recently, the Computer Emergency Response Team of India (CERT-IN) issued an advisory about social engineering attacks in which threat actors pose a legitimate threat to capture confidential data from employees.

There has always been a tension between the need for security and the requirement for ease of access to enable high productivity. But right now, with almost all businesses oper-

ating with a distributed workforce, security diligence is often losing out in the negotiations in favor of fast adoption. What are some of the ways to overcome these challenges?

Boost to Zero Trust Networking

Traditional perimeter security depended on firewalls, VPNs, and Web gateways to separate trusted from untrusted users. But as mobile employees began accessing the network via their own devices, perimeters blurred. Employees virtually disappeared with the rise of cloud computing and IoT devices. This resulted in an escalating risk of vulnerability, breaking down what was once the trusted

down to a person, an endpoint, and a protected resource. Users include your employees, contractors, and business partners that have access to your systems. Once you have built your Zero Trust policy around your protected surface, enterprise should ensure that user access specific applications that are updated.

Basic Cyber Hygiene

Cyber Hygiene can be a great practice of end-users when they are engaging in activities on the World Wide Web. It is crucial to ensure that your employees are in the habit of practicing good cyber hygiene. Everyone doing their part can go a long way to protect both individual employees and the com-

Zero Trust security requires meticulous identity verification for every person and devices trying to access resources on a private network, regardless of whether they are sitting within or outside of the network perimeter

enterprise zone of control and leaving many organizations exposed to data breaches, malware, and ransomware attacks. Protection is now needed where applications and data, and users and devices, are located. Zero Trust security requires meticulous identity verification for every person and devices trying to access resources on a private network, regardless of whether they are sitting within or outside of the network perimeter. Every organization's first inclination is often to set up a VPN but this is not always enough. While they are still commonly used and there are still occasional needs for them, "Zero Trust" or "Beyond Corp" style virtual networking is a far better solution. This approach must be implemented across the entire organization. Whether you are giving users access to apps or administrators access to servers, it all comes

pany from cybercriminals. Providing tools like multi-factor authentication and password managers are good examples. It is important to remind employees to make sure their home routers are also up to date with WPA2 security and strong passwords, resist the urge to work at insecure networks without protection.

As work from home continues, implementing a Zero Trust approach should be the priority for CISOs, their security teams, and users. We are fortunate that there are devices accessible today to shift to remote work seamlessly. It is essential to use this time to polish up your security posture and make them work in any environment. ■

The author is Security Solutions Architect at F5



Implementing An Effective AML/CFT Training Program

A comprehensive AML training program can be the first and best to combat heightened ML risk

By KV Karthik & Manish Mandhyan

Given the continuous evolution of Money Laundering (ML) schemes, it is increasingly challenging for Anti-money Laundering/Combating the Financing of Terrorism (AML/CFT) professionals to remain vigilant and detect the red flags. While institutions primarily focus on other aspects of the AML compliance program, namely, Transaction Monitoring (TM), Know Your Customer/Customer Due Diligence

(KYC/CDD), and internal audit, and a comprehensive AML training program can be the first and best to combat heightened ML risk. Usually, Financial Institutions (FIs) tend to adopt a 'tick the box' approach to their AML training programs, and implement a 'one size fits all' training program. This can be problematic and result in a limited understanding of red flags across the AML compliance program, resulting in the inability to detect red flags and investigate suspicious transactions.

It is no wonder that about 30% of India-based survey respondents of the Deloitte Anti Money Laundering Preparedness Survey, 2020, have prioritized investments in AML training in the next two years.

The Financial Action Task Force (FATF) and the RBI's master direction on KYC mentions the need for an ongoing employee-training program, preferably with customized training depending on the staff's role in the AML compliance framework.

In our experience, an effective AML training program could include the following elements:

Identifying target employees

The first step in designing an effective program is to identify the target employees. While all employees should be mandatorily trained on general AML requirements and guidance, a more targeted training program should be implemented for individuals who can directly impact the bank's ML efforts, i.e., personnel with direct customer contact, compliance and audit personnel, senior management and board of directors, trade finance personnel, payments processing personnel, etc.

Identifying the topics for training

After identifying the target employee base, topics that need to be covered in the training should also be identified. This will vary according to the FIs, the products, and services it offers,

but the following basic elements should be covered:

- General information, including background and history pertaining to ML controls, what ML and Terrorist Financing (TF) mean, why the perpetrators do it, and why stopping them is important
- Legal framework, including how AML laws apply to institutions and their employees
- Penalties for AML violations, including criminal and civil penalties, fines, jail terms, and internal sanctions, such as disciplinary action up to and including termination of employment
- How to react when faced with a suspicious client or transaction
- How to respond to customers who want to circumvent reporting requirements
- Internal policies, such as customer identification, verification procedures, and CDD policies
- Duties and accountabilities of employees

An effective training program should also include real-life ML case studies, how the activity was detected, and its impact on the FI. More specific and targeted case studies could be used to train the employees involved in areas with heightened ML risk such as account opening, trade finance, correspondent banking, private banking, etc. New hire training, whether general or targeted/role-based should be more comprehensive than the training provided to existing employees.

Identifying the 'how'

To ensure the training program is effective, a decision on whether the training should be onsite/in-person training, web-based, by external vendors or internal training by the AML team should be made. In our experience, the most effective training programs use a combination of different platforms depending on the audience and the topics that are required to be covered.

Identifying the frequency of the training

While the AML training can occur when most appropriate for the respective FI, training should be current and relevant to FIs business model and regulatory requirements. Most FIs ensure that all employees are provided a general AML training at least annually. Ongoing and targeted training can be provided quarterly to personnel who are in high-risk functions.

In addition, employees attending the training must complete knowledge assessments. Their attendance should be tracked and any unexcused absences from mandatory AML training should warrant disciplinary action. All AML training sessions should be documented, and the FI should maintain the training and testing materials, dates of training sessions and attendance records for a review. ■



The first step in designing an effective training program is to identify the target employees

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5G Or Wi-Fi 6: What Will Power The Enterprise Network?

Both 5G and Wi-Fi 6 will have a role to play in the enterprise now and into the future with 5G dominating broad outdoor coverage while Wi-Fi 6 dominates indoor networks

By Balaka Baruah Aggarwal

Each new generation of technology is accompanied by speculations about its competitive advantages and what it offers as an opportunity. The arrival of 5G and Wi-Fi 6 are no different, as businesses obsessed with speed and agility deliberate whether 5G or Wi-Fi 6 should be the preferred technology for enterprises.

Will the quest for digital transformation touch an inflection point with advanced wireless capabilities? Given the imperative of staying ahead of the curve, the heightened interest is valid and frenzied discussions are important to make sound decisions faster.

But first, a low down on what both technologies offer. Not surprisingly, both technologies are faster than the

predecessors; will significantly boost bandwidth and network capacity; are energy-efficient and capable of supporting more simultaneous devices.

Wi-Fi 6 can support up to 8 simultaneous users from a single access point; offers higher flexibility to deploy channels from 20 MHz to 160 MHz; and has greater efficiency and lower latency by integrating OFDMA technology.



By using a blend of both the technologies, enterprises will be able to deliver higher value such as enhanced collaboration amongst employees with high quality audio and video communication and even immersive experiences

5G on the other hand works on a wide range of spectrum; supports WLAN which is expected to significantly boost SD-WAN adoption; supports connectivity while roaming even in bullet trains; and supports QoS differentiation with innovative network slicing for specific use cases. An additional advantage of 5G is it can use dedicated locally licensed spectrum for critical industrial applications.

So, what's in it for enterprises?

Clearly, both Wi-Fi 6 and 5G will co-exist in the enterprise as advanced wireless technology will see a surge in adoption in a hyperconnected world. As more IoT devices get connected into the enterprise network, speed and bandwidth will see unprecedented demand making wireless technologies an appealing alternative to traditional wireline networks.

Many organizations are viewing these technologies as a force multiplier to adopt new technologies such as AI, data analytics, edge computing and IoT. According to a survey by Deloitte across 415 respondents in

the US during the first quarter of 2020, 86% of networking executives believed that advanced wireless will transform the organization within three years and 79% of the surveyed executives say the same about the industry.

Respondents identified improved efficiencies, enhanced security and taking advantage of new technologies as the top benefits of advanced wireless technologies. Interestingly, 57% regarded their company's current networking infrastructure as preventing them from addressing the innovative use cases they would like to target.

Use Cases that are likely to dominate

Both 5G and Wi-Fi 6 will have a role to play in the enterprise now and into the future with 5G dominating broad outdoor coverage while Wi-Fi 6 dominates indoor networks. However, overlapping use cases will emerge such as IoT deployments, healthcare facilities with devices dispersed across the premises requiring real-time connectivity; stadiums hosting events, hospitality and government initia-

tives such as Smart cities which will consume inordinate amount of bandwidth and connectivity.

By using a blend of both the technologies, enterprises will be able to deliver higher value such as enhanced collaboration amongst employees with high quality audio and video communication and even immersive experiences. As remote working becomes the new normal in the post-COVID scenario such initiatives will boost productivity.

More adoption of smart factory solutions will kick in as advanced wireless connectivity will provide enhanced visibility into assembly line and enable market synchronization with production line. Just as asset tracking, fleet management, remote controlled drones and robots for delivery will get a boost with rapid adoption of these technologies.

An early mover has its advantages but the uncertainties of a path breaker has inherent risks. However by taking a thoughtful approach, enterprises can mitigate risks and reap the benefits of advanced wireless technologies. ■



AI Is The Business Differentiator For E-Commerce Industry

E-commerce giants are resorting to Artificial Intelligence (AI) to offset challenges in a variety of applications from adhering to social distancing measures, boosting sales and optimizing routes for fulfilment of delivery

By Balaka Baruah Aggarwal

As global economies wake up to new realities of the COVID-19 pandemic, e-commerce giants are resorting to Artificial Intelligence (AI) to offset challenges in a variety of applications from adhering

to social distancing measures, boosting sales and optimizing routes for fulfilment of delivery.

Amidst concerns about the safety of workers in Amazon offices and warehouses, the company responded by using AI to determine safe dis-

tances and ensure adherence to prescribed standards. The Amazon AI system called Digital Assistant uses camera footages which highlight workers keeping safe distances in green and those not adhering in red. The system also identifies high-

traffic areas to avoid route congestion for delivery.

Predictably Amazon's bottomline has shored up during the first quarter of 2020—bumped up demand for essential items during the lockdown period—at USD 75.5 billion compared to USD 59.7 billion in the first quarter, previous year.

BigBasket has been extensively using AI to manage operations efficiently and procure inventory of perishable goods such as fruits and vegetables. Based on predictive analytics, the company can accurately forecast demand and plan inventory to reduce storage period and eliminate waste which in turn help reduce expenditure significantly.

According to E-commerce Trends 2020, a report by Unicommerce, the overall e-commerce market in India has not just recovered but has witnessed an order volume growth of 17% as of June 2020. This is in tandem with global trends where online purchases of clothing are up by 76.7% and online revenue up by 22.2% with online grocery seeing a 9% increase from May to June as people become comfortable buying online.

These trends are likely to continue post-COVID as many first-time buyers become comfortable using online and regularly shop essential items online. The Ecommerce Trends report indicate there is an increasing trend of consumers to buy directly from brands' websites and therefore retail brands are now strengthening the online capabilities and opting for different approaches to connect with consumers. Also 66% of total online consumer demand in India come from tier II and beyond cities and this share is expected to rise in coming years.

So what can e-commerce sellers do to optimize the shopping experience while boosting the bottomline?

For long, even though we have not paid attention, shopping experience on large online platforms, such as Amazon, Grofers, Big Basket, Myntra have been influenced by recommendation engines which are based on

intelligent algorithms. According to a McKinsey report 35% of what consumers purchase on Amazon and 75% of what they watch on Netflix come from product recommendations based on such algorithms. While we may not be aware as Amazon never specifically talks about its recommendation engines but they clearly play a critical role in Amazon's digital strategy and the product recommendations that appear on the browser's page is the outcome of an intelligent collaborative-filtering process which takes into

account a complex interplay of individual preferences, preferences of similar people, within groups in departments, industry, etc.

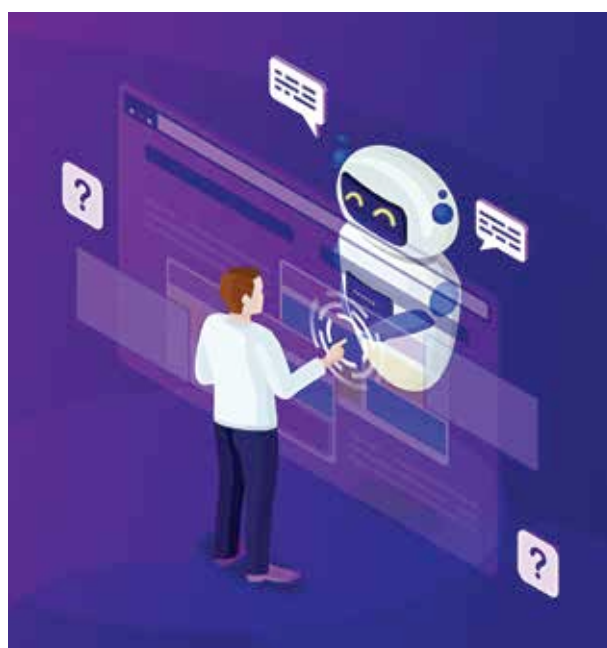
Another common and increasingly leveraged AI tool is chatbots which are highly effective to scale the 'personalized shopping assistant' experience. Based on questions of prospects, the underlying intelligent system immediately recognizes keywords, identifies the message and responds appropriately to the prospect. While personalizing the experience, chat-

bots also help save a lot on manpower to address first line of query.

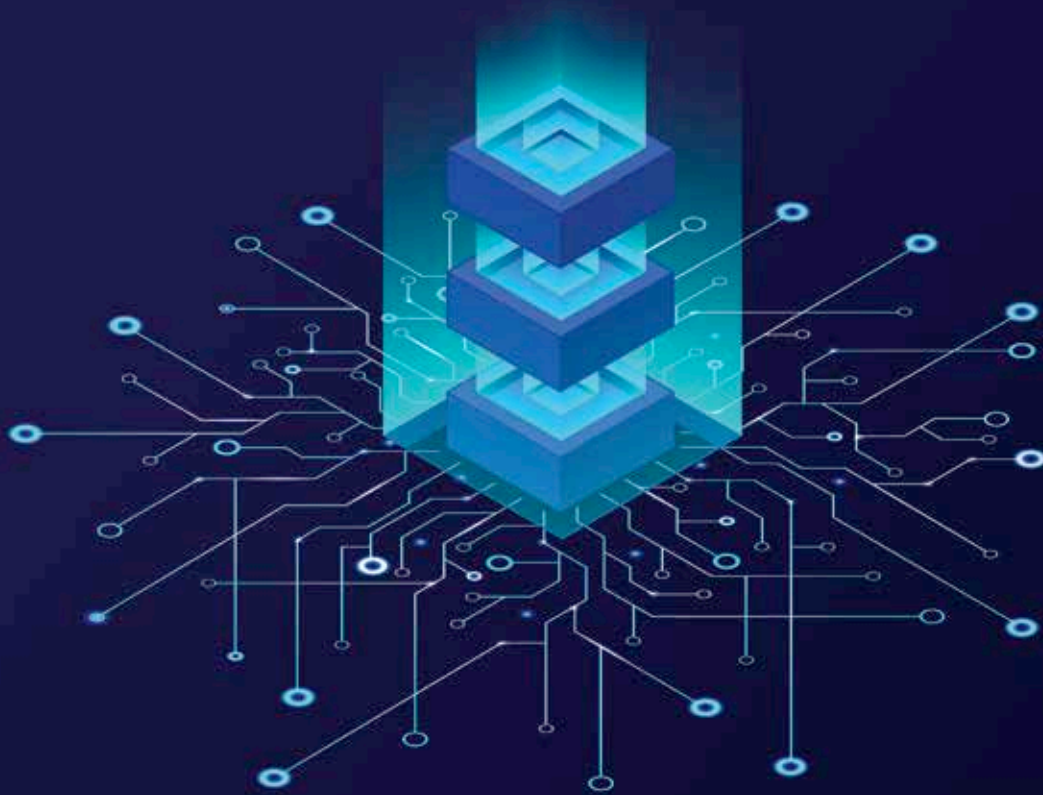
E-commerce presents an exciting opportunity for entrepreneurs in that it leaves the digital footprint of buyers throughout the time spent on the website. This is in contrast with physical retailing where understanding the customer needs becomes a challenge and requires much effort. The key then is to capture customer information,

mine it effectively, and map it with internal operations to impact business outcomes.

Going forward, deploying intelligent systems for online activities will no longer be an option but become a mainstream feature without which business competitiveness will be seriously undermined. In the Google report on Machine Learning, Fausto Ibarra, Director of Global Product Management for Google Cloud Platform, says "What is keeping business leaders awake at night is how to harvest and make sense of their data for competitive advantage. Machine learning is allowing companies to surface the untapped value in their data." ■



E-commerce leaves the digital footprint of buyers in contrast to physical retailing where understanding the customer needs becomes a challenge and requires effort



Are Big Data-Based Artificial Intelligence Initiatives Environmentally Sustainable?

While we embrace the bright sparks AI has brought into our lives, we also need to consider the environmental impact of using high-powered machines which are constantly capturing and processing information to make the algorithm intelligent

By Balaka Baruah Aggarwal

The excitement around Artificial Intelligence (AI) is palpable as intelligent systems take over increasing number of business and personal activities. From facial recognition, recommendation engines, customer care, managing critical infrastructure to intelligent refrigerators and entertainment systems, AI has permeated every aspect of our lives.

While we embrace the bright sparks AI has brought into our lives, we also need to consider the environmental impact of using high-powered machines which are constantly capturing and processing information to make the algorithm intelligent. A research paper published in the Journal of Parallel and Distributed Computing analyzed different approaches to energy consumption and Machine Learning (ML) in particular and found that sophisticated algorithms that deliver higher level of accuracy consumed more energy.

AI honed by ML and fed by Big Data requires massive storage and computational power. Given the volume and velocity of Big Data, there is a need for huge storage and powerful, scalable IT systems making it an ideal use case for Cloud computing as it allows customers to take advantage of distributed machines and provision resources on demand.

Cloud service providers are continuously expanding data centers to meet with the demand for data intensive applications, such as AI, social media, streaming video and financial analysis. Not surprisingly data centers are consuming massive amounts of electricity accounting for 1% of the world's electricity in 2010.

According to the study published in Science, the amount of computing done in data centers increased six-fold between 2010 and 2018, yet the amount of energy consumed by the world's data centers grew only 6% during that period, thanks to improvements in energy efficiency. This is reflected in the ongoing efforts by Cloud service providers, such as Ama-



zon Web Services (AWS), Microsoft Azure, and Google Cloud in building energy-efficient data centers.

The report however warned that there is no guarantee the efficiency drive will continue in the face of data-hungry new technologies, such as AI and 5G.

So how are Cloud services faring in the quest for green goals? A quick look at the big three:

Microsoft: Microsoft's Director of Energy Research, Sean James, explains in a company blog that companies looking to deploy Cloud technology in an environmentally-friendly way is better off collaborating with cloud providers as data centers are up to 93% more energy efficient and up to 98% more carbon efficient than traditional on premise operations.

Such efficiencies are possible due to policies that place sustainability at the forefront and continuous research in energy-efficient technologies. The blog states Microsoft is on track to achieve its ambition of powering its data centers with 100% renewable energy and by the end of this year, the company will meet its 2020 target of 60% energy via renewable energy and 70% by 2023.

AWS: AWS has a goal of meeting 100% of the energy needs of its global infrastructure by 2030 with its investments in renewable energy projects

across the world. AWS has 86 renewable energy projects in solar and wind farms around Europe, Australia, and the US with a capacity to generate 2,300 MW investments, which are connected to the grids powering AWS data centers. In a press release, Kara Hurst, Vice President of Sustainability, Amazon, said during the launch of new projects, "These new renewable energy projects are part of our roadmap to 80% renewable energy by 2024 and 100% renewable energy by 2030."

Google: Google has designed highly efficient Tensor Processing Units—which is the AI chips behind Google's advances in ML—and outfitted all its data centers with high-performance servers. Starting in 2014, Google began using ML to automatically optimize data center cooling and deployed smart temperature, lighting, and cooling controls to further reduce the energy used at its data centers.

By controlling data center cooling with AI-powered recommendation system, Google has achieved consistent energy savings of around 30% on average. The average annual power usage effectiveness for the company's global fleet of data centers in 2019 was 1.10 compared with the industry average of 1.67—meaning that Google data centers use about six times less overhead energy for every unit of IT equipment energy. ■



Are You Keeping Up The Morale Of Your IT Team?

While working remotely does have positive outcomes, such as increased productivity, employee satisfaction and better work-life balance but the prolonged remote working is having a telling effect on the mental and physical health

By Balaka Baruah Aggarwal

With no end in sight for COVID pandemic and WFH likely to continue for some more time, IT teams are beginning to show signs of wearing out—desperate to return to a familiar routine of going to office, meeting

colleagues, sitting across a table, impromptu meetings, water cooler discussions. After nearly six months of working remotely, some businesses have adopted a cautious approach to map the return to normalcy while others are still working largely remotely with only a skeletal team at office.

While working remotely does have positive outcomes, such as increased productivity, employee satisfaction and better work-life balance but the prolonged remote working is having a telling effect on the mental and physical health. The initial enthusiasm of remote working is dissipating and

employees are now eagerly awaiting a return to the pre-COVID routine.

During the initial days of lockdown, the IT team was busy enabling the organization to work remotely, ensuring employees have the systems, tools and secure networks in place to continue smooth operations. With time as systems fall into a routine, the CIO must face the next critical question of keeping up the energy levels of the IT team and ensure continuous productivity, engagement and high morale.

An article in Harvard Business Review identifies three positive motivators to increase work performance. First is play, which refers to the joy of problem solving which becomes easier when working with a colleague or a group or taking a decision with everyone onboard. Second is purpose which is the visibility into the impact of the contribution on client or colleagues, and third is potential which

refers to the access to colleagues to learn and develop.

These are important considerations as working remotely may well become the new normal. Says Ashish Pandey, CIO, GlaxoSmithKline, "Given that working remotely has become feasible, roles which do not require a day-to-day presence may continue with the current setup enabling the business to save on several fronts including real estate. For example, developers are well equipped to work independently as long as they stick to schedules."

CIOs in India are keenly aware of the new challenges panning out and embracing it with simple, practical measures, often with a personal touch. As leaders of the IT organization CIOs are using instincts to reach out and take care of the overall well-being of the team. Speaking with CIOs, we have found

some savvy approaches to keep the team motivated.

Keeping it personal: IT leaders are talking to the team to connect at a personal level at least once a week, asking about the wellbeing of the family and mentoring professionally. Discussions range from dealing with stress related to COVID to physical challenges of space to what courses to pursue and skills to acquire for the next growth phase. Says Ashok Jade, CIO, Spark Minda, "These conversations keep us connected, the team motivated and help us to tide through this period."

Reduce meetings: A fallout of working remotely is increased communication via calls and video, resulting in fatigue, stress and burnout. IT leaders have recognized this and ruled out unnecessary participation. At GlaxoSmithKline, IT teams have agile calls with people fleeting in and out when the conversation is over. Team members can also refuse calls when they do not think presence is required.

Stimulate with ideation: It isn't enough to reduce fatigue and CIOs are keeping the team stimulated with ideation challenges such as Airworks India Engineering wherein the company launched a project called Idea Box which elicited more than 250 ideas to improve efficiency and optimize processes, most of which are currently being implemented.

New initiatives: Teams bite into a challenge way more than regular projects, so when the team at DishTV needed to develop an app to remotely support DTH customers, it responded like on a mission and accomplished it successfully even while working across teams remotely.

There is no precedent to the current situation and therefore no reference or guidelines but IT leaders must continue to find ways to address team motivation, otherwise a decline in adaptability will take a heavy toll on the team when the post-coronavirus recovery will require huge leaps in productivity and growth. ■



CIOs in India are keenly aware of the new challenges panning out and embracing it with simple, practical measures, often with a personal touch



How Digital Transformation Is Saving The Day For Good Earth

The sustainable luxury brand has not just built in better resilience but has managed to gain customer insights continuously and build that into business strategy

By Balaka Baruah Aggarwal

Good Earth—a premier brand offering clothes and lifestyle goods with physical and online stores—was able to offset the disruption caused by COVID-19 with more than 100% increase in its digital business. As a design studio, the physical stores are critical to its omnichannel strategy to deliver an exclusive customer experience by enabling look and feel of artifacts, clothes and other household items.

However, as the pandemic caused a steep downfall in customer footfall, the business stepped up its online initiatives and focused on tighter integration of the omnichannel experience. This included an increase in customer engagement activities by making personal offers to individual clients and promoting voucher redemption across any platform; enabling to order online and pick up from stores; and place in-store orders for any item if it is available in the central inventory.



Digital has empowered the IT team to consistently deliver high performance with visibility into operations and enhanced security

These initiatives coupled with closely observing the digital footprint of customers have enabled to deliver a customized experience and ramp up sales. Digital also enabled to design a highly effective loyalty program by continuously monitoring customer behavior and browsing habits to create a seamless experience across channels and make appropriate offers at the touch point.

One of the outcomes of observing customer journey was to enhance the mobile experience with progressive web app as 90% of traffic emanate from mobile and 82% checkouts take place from mobile. Speaking about the efforts to enhance the customer journey Dinesh Joshi, CIO, Good Earth says, “Digital is deeply integrated into our business strategy as it enables to study the customer experience at every touchpoint with data capture. This provides insights to personalize subsequent engagements, provide better recommendations and enhance search capabilities.”

Delivering a good search experience is important as it drives around 10% revenue and the company wants to boost its search-driven revenue with machine learning to make search and recommendation engines more accurate.

Adversity Triggers Digital Transformation Journey

The 24-year-old company—with a turnover touching INR 200 crore and stores across Indian cities—embarked on the transformation journey several years ago when its website crashed during a sale. The company had promptly moved its web application to AWS and had resumed operations within hours.

Since then, the company has meticulously honed the Cloud journey adopting Cloud-native technologies

including DevOps and containerization to continuously delight the customer with innovative features. As luck would have been, the company had completed migrating its Microsoft Navision ERP workload to AWS Cloud just before the Covid pandemic which has facilitated digital innovations in the wake of restrictions.

Delivering a good search experience is important as it drives around 10% revenue and the company wants to boost its search-driven revenue with ML

A major benefit of the Cloud journey has been in accessing low-cost storage. Working with craftsmen and artisans across the country, the design store generates tons of designs which are business-critical and require hot and cold storage facilities. AWS S3 and AWS Glacier offers differential storage capabilities enabling Good Earth to store 55-60TB of data at extremely low cost.

Digital has empowered the IT team to consistently deliver high performance with visibility into operations and enhanced security. More importantly, it empowers operations with the ability to loop the learnings from tracing the customer journey into business strategy. Says Joshi, “The performance dashboard gives insights into every aspect of operations—speed of page load, time taken to return queries from database, knowing at which stage customer abandoned the purchase decision—equips us with insights to take preventive measures.” ■



Image Credit: Omkar09 / Shutterstock.com

The DishTV Story Of Overcoming The Pandemic

This is the tale of a business that not only survived but thrived during the pandemic by entertaining the population and making the stay at home pleasant and bearable

By Balaka Baruah Aggarwal

As Coronavirus pandemic continues to hold sway over our lives, cheerful news about how businesses fought back and won are igniting sparks of hope and positivity. This is the tale of a business that not only survived but thrived during the pandemic by entertaining the population and making the stay at home pleasant and bearable.

Fearing a lockdown, the IT department had carried out drills of business continuity by operating with a skeletal team, so when the announcement came, the organization was not entirely caught offguard, although the entire chain of operations was not in place and therefore a lot of solutions entailed thinking off the hat.

The frenzy of calls for help increased as more people tuned in and subscriber base shot up. DishTV witnessed a 50% surge in content consumption, adding an unprecedented one million new subscribers during the first month of the lockdown, bringing total subscriber base to more than three million. The duration of time viewers spent on its OTT platform, Watcho, also spiked during March 2020.

With call centers closed and pressure to keep operations running to meet customer demand, the company had to develop a mechanism to enable agents to work from home.

With call centers closed and pressure to keep operations running to meet customer demand, the company had to develop a mechanism to enable agents to work from home

Therefore calls from the subscriber management system (SMS)—which also handles the call centre's call management, agent management and service ticket management—were diverted to mobile phones of agents across the country and access to the SMS system was enabled, so agents could function remotely.

Within two days of lockdown, the team had remodeled operations on a trial basis and after two weeks it became a full-featured platform, offering all kinds of customer support.

The bigger challenge was to ensure that networks of telecom operators were always available. Speaking about the solution, Abhishek Gupta, VP - IT at DishTV says, "We had to do things differently as traditional approach would have been slow. So, we designed a small box, inserted SIM cards of mobile operators and developed software which constantly kept dialing the lines of operators and

automatically re-routed calls when a network problem was detected."

Soon after, the company also launched a chatbot called D2H Intelligent Assistant (DIA) using the latest Artificial Intelligence (AI) technology for its customers. DIA is a one-stop solution to solve service queries through an automated assistant in real-time, using a conversational mode to process user requests and queries 24x7, leveraging AI and Deep Learning.

"This is a big achievement given that teams were working remotely, and conceptualizing, developing and implementing the chatbot within a short time requires a great deal of coordination and collaboration," says Gupta.

Other initiatives launched during the lockdown included 'PayLater' wherein customers can call up DishTV or give a missed call to avail extended viewing period. At the same time, integration with UPI, BharatPe and other digital platforms pushed the adoption of digital payments.

Much of the agility can be attributed to the digital transformation DishTV embarked years ago when the company acquired Videocon d2H and had to integrate disparate systems. The integration was facilitated by the in-house IT team of 250 members working closely with businesses to provide a differentiated customer experience. Benchmarked against international standards, such as ISO 7001, CMM, the IT team adheres to ITIL processes, and holds the distinction of being the first media company in the world to be appraised at CMM Level-5. ■





Two times
the revelation



Shailesh Daterao

Senior Manager - IT, Bajaj Finance

A BOOK I LOVE READING

Nature Blogs

MY FAVORITE GADGET

Smartphone



MY FAVORITE SINGER

Kishore Kumar



**AN EMERGING TECH I'M
USING IN THE NEW NORMAL**

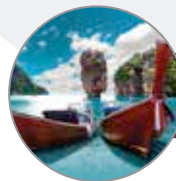
Cloud Technology

**MY PEER IN THE IT
COMMUNITY**

Salim Sayyad, Head - IT
Infra, TransUnion

**A HOLIDAY SPOT I'D LIKE TO
VISIT IN THE NEAR FUTURE**

Phuket



Salim Sayyad

Head - IT Infra, TransUnion

MY FAVORITE SPORTSPERSON

Virat Kohli



A TECH SHOW I LOVE TO WATCH

Cybersecurity show



A TECH IDOL I ADMIRE

Sundar Pichai

MY FAVORITE SPORTSPERSON

Virat Kohli



MY FAVORITE CAR

Audi



MY FAVORITE CUISINE

Rajma-Chawal



डिजिट अब हिंदी में

देश का सबसे लोकप्रिय और विश्वसनीय टेक्नोलॉजी वेबसाइट डिजिट अब हिंदी में उपलब्ध है। नयी हिंदी वेबसाइट आपको टेक्नोलॉजी से जुड़े हर छोटी बड़ी घटनाओं से अवगत रखेगी। साथ में नए हिंदी वेबसाइट पर आपको डिजिट टेस्ट लैब से विस्तृत गैजेट रिव्यू से लेकर टेक सुझाव मिलेंगे। डिजिट जल्द ही और भी अन्य भारतीय भाषाओं में उपलब्ध होगा।

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